

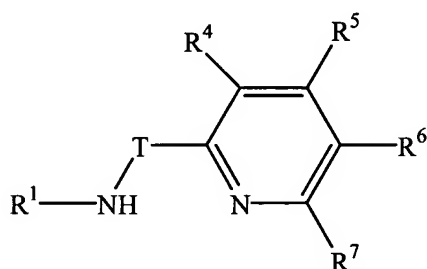
AMENDMENTS TO THE CLAIMS

Please substitute the following pending claims 25-33 as replacement claims for the previously-pending claims. In this Amendment B, claims 25-28, and 30 have been amended.

Claims 1-24 (canceled).

25. (Currently amended) A catalyst for the production of a polymer comprising a composition comprising:

(1) a ligand characterized by the following general formula:



wherein R¹ is selected from the group consisting of alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted ~~heterocycloalkyl~~ heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl and combinations thereof.

T is -CR²R³- and R² and R³ are independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted ~~heterocycloalkyl~~ heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxyl, aryloxyl, silyl, boryl, phosphino, amino, thio, seleno, halide, nitro, and combinations thereof;

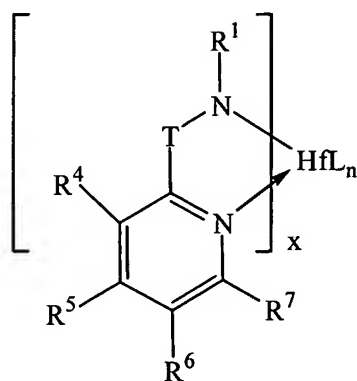
R⁴, R⁵, R⁶ and R⁷ are each independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted ~~heterocycloalkyl~~ heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxyl, aryloxyl, silyl, boryl, phosphino, amino, thio, seleno, halide, nitro, and combinations thereof; and optionally, any combination of R¹, R², R³, R⁴, R⁵, or R⁶ may be joined together in a ring structure;

provided that either R^3 or R^7 is selected only from the group consisting of aryl, substituted aryl, heteroaryl and substituted heteroaryl;

(2) a metal precursor compound characterized by the general formula $Hf(L)_n$ wherein each L is independently selected from the group consisting of halide, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, hydroxy, boryl, silyl, amino, amine, hydrido, allyl, diene, seleno, phosphino, phosphine, carboxylates, thio, 1,3-dionates, oxalates, carbonates, nitrates, sulphates, ethers, thioethers and combinations thereof or optionally two or more L groups are joined into a ring structure; n is 1, 2, 3, 4, 5, or 6; and

(3) optionally, at least one activator.

26. (Currently amended) A catalyst for the production of a polymer comprising at least one activator and a metal-ligand complex characterized by the following formula:



wherein R^1 is selected from the group consisting of alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl and combinations thereof.

T is $-CR^2R^3-$ and R^2 and R^3 are independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl,

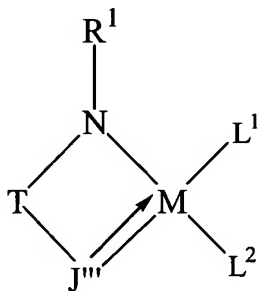
phosphino, amino, thio, seleno, halide, nitro, and combinations thereof;

R^4 , R^5 , R^6 and R^7 are each independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted ~~heterocycloalkyl~~ heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino, amino, thio, seleno, halide, nitro, and combinations thereof; and optionally, any combination of R^1 , R^2 , R^3 , R^4 , R^5 , or R^6 may be joined together in a ring structure;

provided that either R^3 or R^7 is selected only from the group consisting of aryl, substituted aryl, heteroaryl and substituted heteroaryl;

each L is independently selected from the group consisting of halide, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted ~~heteroalkyl~~ heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, hydroxy, boryl, silyl, amino, amine, hydrido, allyl, diene, seleno, phosphino, phosphine, carboxylates, thio, 1,3-dionates, oxalates, carbonates, nitrates, sulphates, ethers, thioethers and combinations thereof or optionally two or more L groups are joined into a ring structure; n is 1, 2, 3, 4, 5, or 6; and x is 1 or 2.

27. (Currently amended) A catalyst for the production of a polymer comprising at least one activator and a metal complex characterized by the formula:



where M is zirconium or hafnium;

wherein R^1 is selected from the group consisting of alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted ~~heterocycloalkyl~~ heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted

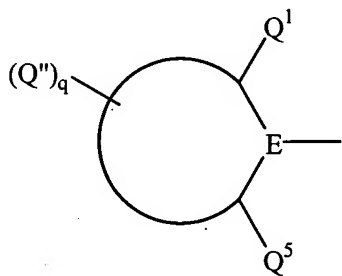
heteroaryl and combinations thereof.

T is a bridging group selected from the group consisting of $-\text{CR}^2\text{R}^3-$ and $-\text{SiR}^2\text{R}^3-$ with R^2 and R^3 being independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted ~~heterocycloalkyl~~ heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino, amino, thio, seleno, halide, nitro, and combinations thereof;

J''' being selected from the group of substituted heteroaryls with 2 atoms bonded to the metal M, at least one of those 2 atoms being a heteroatom, and with one atom of J''' is bonded to M via a dative bond, the other through a covalent bond; and

L^1 and L^2 are independently selected from the group consisting of halide, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, hydroxy, boryl, silyl, amino, amine, hydrido, allyl, diene, seleno, phosphino, phosphine, carboxylates, thio, 1,3-dionates, oxalates, carbonates, nitrates, sulphates, ethers, thioethers and combinations thereof or optionally two or more L groups are joined into a ring structure.

28. (Currently amended) The catalyst of either of claims 25, 26 or 27, wherein R^1 is characterized by the general formula:



wherein E is either carbon or nitrogen,

Q^1 and Q^5 are substituents on the R^1 ring at a position ortho to E, with Q^1 and Q^5 are independently selected from the group consisting of alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, aryl, substituted aryl and silyl, but provided that Q^1 and Q^5 are not both methyl; and

Q^q represents additional possible substituents on the ring, with q being 1, 2, 3, 4 or 5 and Q'' being selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted ~~heterocycloalkyl~~ heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxyl, aryloxy, silyl, boryl, phosphino, amino, thio, seleno, halide, nitro, and combinations thereof.

29. (Original) The catalyst of either of claims 25, 26 or 27, wherein R^3 is selected from the group consisting of benzyl, phenyl, naphthyl, 2-biphenyl, 2-dimethylaminophenyl, 2-methoxyphenyl, anthracenyl, mesityl, 2-pyridyl, 3,5-dimethylphenyl, o-tolyl, and phenanthrenyl.

30. (Currently amended) The catalyst of ~~either of claim 28~~, wherein Q^1 and Q^5 are, independently, selected from the group consisting of $-CH_2R^{15}$, $-CHR^{16}R^{17}$ and methyl, provided that not both Q^1 and Q^5 are methyl, wherein R^{15} is selected from the group consisting of alkyl, substituted alkyl, aryl and substituted aryl; R^{16} and R^{17} are independently selected from the group consisting of alkyl, substituted alkyl, aryl and substituted aryl; and optionally R^{16} and R^{17} are joined together in a ring structure having from 3-50 non-hydrogen atoms.

31. (Original) The catalyst of claim 29, wherein Q^2 , Q^3 , and Q^4 are each hydrogen and Q^1 and Q^5 are both isopropyl; or both ethyl; or both sec-butyl; or Q^1 is methyl and Q^5 is isopropyl; or Q^1 is ethyl and Q^5 is sec-butyl.

32. (Original) The catalyst of claim 28, wherein R^1 is selected from the group consisting of mesityl; 2-Me-naphthyl; 2,6-(Prⁱ)₂-C₆H₃-; 2-Prⁱ-6-Me-C₆H₃-; 2,6-Et₂-C₆H₃-; and 2-sec-butyl-6-Et-C₆H₃-.

33. (Original) The catalyst of either of claims 25, 26 or 27, wherein R^7 is selected from the group consisting of phenyl, naphthyl, mesityl, anthracenyl and phenanthrenyl.